

REMARKS

Claims 1 and 4 are now pending in the application. Claims 1 and 4 stand rejected. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Applicants thank the Examiner for removing the previous §112 rejection in light of Applicants' previous arguments.

REJECTION UNDER 35 U.S.C. §§ 102/103

Claims 1 and 4 stand rejected under 35 U.S.C. §102(b) as being anticipated by or under 35 U.S.C. §103(a) as being obviated by DiPierro Bosco et al. (U.S. Patent No. 6,103,409). This rejection is respectfully traversed.

Applicants respectfully assert that the DiPierro Bosco et al. patent does not anticipate Applicants' claims because the DiPierro Bosco et al. fuel cell fails to provide a system controller having executable logic for generating a set of differential pressure signals and determining a root-mean-square of the set of generated differential pressure signals to control the vaporized water source. Further, the DiPierro Bosco et al. patent requires an *a priori* collection of data for operation. In other words, the DiPierro Bosco et al. patent requires that one measure all anode and cathode pressure drops at every combination of flow and electrical load conditions expected to be encountered during fuel cell operation in order to establish the predetermined thresholds of unacceptability. See the first box in Fig. 2 and Column 5. This is in direct contrast to Applicants' claimed

invention which includes a controller to generate the set of differential pressure signals without reliance on an *a priori* data set.

The Office Action additionally asserts that Applicants' claims are anticipated because the DiPiermo Bosco et al. system may be fitted with Microsoft Windows (col. 5, ll. 53-62) and "Windows includes Excel Spreadsheets which have executable logic for determining a root-mean-square value." Office Action at page 5. Applicants point out that the DiPiermo Bosco et al. patent does not disclose or impliedly reference the Excel software or any spreadsheet. The DiPiermo Bosco et al. microprocessor lacks the feature of "having executable logic for determining a root-mean-square value from said set of differential pressure signals and control circuitry for controlling said vaporized water source in response to the root-mean-square value" as claimed by Applicants.

While Excel can be run using the Windows operating system, Excel is a wholly separate program from Windows. Applicants find fault with what appears to be official notice that Excel is necessarily a part of the Windows operating system as to support an anticipation rejection. The disclosure of an operating system is not a disclosure of each and every software application that is compatible with the operating system. If the Examiner is taking official notice of the above, Applicants submit that such notice is improper and cannot be used to form part of the principle evidence upon which a rejection is based. See *In re Eynde*, 480 F.2d 1364, 1370, 178 USPQ 470, 474 (CCPA 1973).

The Office Action's reference to the RMS feature of the Excel program merely points up Applicants' earlier argument that one skilled in the art would know how to provide such a feature. Knowing how to include a feature and recognizing the value of including the feature are, however, two different things. The DiPiermo Bosco et al. patent does not disclose a microprocessor having this feature, and so does not anticipate Applicants' claims. Nor is it sufficient for obviousness that the DiPiermo Bosco et al. microprocessor could be modified to have such a feature – of course it can, Applicants have effectively done so – absent some reason in the art to carry out such a modification.

With respect to the §103 rejection, the Office Action points to no reason from the DiPiermo Bosco et al. disclosure, or elsewhere in the prior art, to modify the DiPiermo Bosco et al. fuel cell with Applicants' control of fuel cell humidification. The root-mean-square is different from the DiPiermo Bosco et al. comparison to pressure drop in an unflooded reference stack. Applicants' parameter is based on the statistical value, root-mean-square, determined from the executable logic. The claimed fuel cell stack is thus patentable over the DiPiermo Bosco et al. patent disclosure.

Moreover, Applicants' invention offers unexpected benefits compared to the DiPiermo Bosco et al. system. Applicants' claimed invention can control humidification with no prior knowledge of unflooded stack pressure drops because Applicants' detection method considers only fluctuations about the mean pressure drop reading. Applicants' claimed invention provides sensitivity and speed of measurement which is not disclosed, taught by, or inherent in the DiPiermo Bosco et al. system which is limited to measurements based on the reference fuel cell.

Applicants' unexpectedly improved speed and sensitivity is illustrated in that the pressure drop indication based on the differential fluctuations provides a reasonable steady-state condition after an elapsed time of only 100 seconds. Additionally, for example, Applicants' invention facilitates sampling at 10 Hz or greater which is much more amenable to automotive fuel cell operation where the dynamic load following operation rarely allows for greater than several minutes at a fixed load condition. Paragraph [0044]. Further, Applicants' system achieves a relatively steady state after 100 seconds. Figures 4 and 6. In comparison, the DiPiero Bosco et al. pressure drop indication attains a reasonable steady-state condition after an elapsed time of 1000 seconds. Figure 4 of DiPiero Bosco et al. In this example, Applicants' claimed invention provides a 10-fold increase in speed and in sensitivity. Applicants assert that, even if a *prima facie* case of obviousness had been made, the unexpected results provide a secondary consideration evidencing patentability which Applicants assert weigh in favor of patentability and non-obviousness. See *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966); *In re Sullivan*, 84 USPQ2d 1034 (Fed. Cir. 2007).

Additionally, Applicants' claimed fuel cell provides "an accurate determination of the onset of flooding status and control" and "optimization of stoichiometry with a comparable optimization of air compressor capacity, efficient management of rapid power transits, and data for effective management of stack purge." Paragraph [0054].

As DiPiero Bosco et al. do not disclose, teach, or provide a reason to make Applicants' claimed fuel cell system, reconsideration of the claims and removal of these rejections are respectfully requested.

Claims 1 and 4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiPierro Bosco et al. (U.S. Patent No. 6,103,409), as described above in view of Eryurek et al. (U.S. Patent No. 6,539,267). This rejection is respectfully traversed.

Eryurek et al. discloses a device used in process controls, such as an oil refinery. Column 1, lines 18-38. A variety of statistical parameters and parameter values are calculated based on stored rules. Column 1, lines 51-66. The Eryurek et al. patent uses stored (or trained) values and rules. Accordingly, the data is collected *a priori* for the system. Similarly, DiPierro Bosco requires an *a priori* collection of data for the anode and cathode pressure drops at every combination of flow and electrical load conditions expected to be encountered during fuel cell operation. Thus, the combination teaches an *a priori* collection of data.

In contrast, Applicants use a set of generated differential pressure signals and determine those signals based on the root-mean-square of the pressure fluctuation. The difference in data collection between Applicants' system and systems such as those in the DiPierro Bosco et al. and Eryurek et al. references is what helps provide "an accurate determination of the onset of flooding status and control" and "optimization of stoichiometry with a comparable optimization of air compressor capacity, efficient management of rapid power transits, and data for effective management of stack purge." Paragraph [0054].

Further, Applicants respectfully point out that the rejection fails to provide any guidance, instruction, or analysis as to how a skilled artisan would modify the teachings of the DiPierro Bosco et al. and the Eryurek et al. patents and process controls to remove the *a priori* data set from which all controls are based. Such details are

necessary for a case of obviousness. See *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning to support the legal conclusion of obviousness.”) MPEP §2143 states that “[t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious,” which should be made explicit, as directed by *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). This burden is not met in the present rejection based on the combination of the DiPierro et al. patent and the Eryurek et al. patent.

Accordingly, the combination of the DiPierro et al. patent and the Eryurek et al. patent fails to teach or suggest Applicants’ claimed invention. Reconsideration and withdrawal of the §103 rejection of the claims are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this request for reconsideration is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By:



Stephanie D. Jones, Reg. No. 62,038
Anna M. Budde, Reg. No. 35,085

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

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